Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

A BOTANICAL TRIP TO THE HAWAIIAN ISLANDS

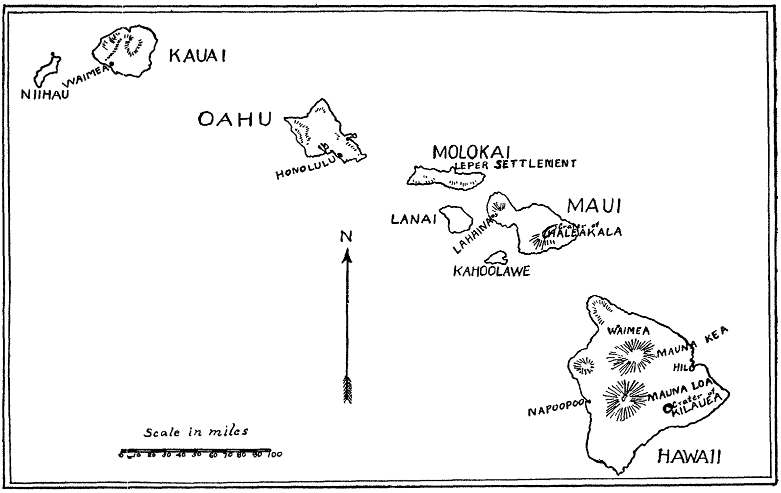
By Professor A. S. HITCHCOCK

U. S. DEPARTMENT OF AGRICULTURE, WASHINGTON, D. C.

DURING the past year I visited the Hawaiian Islands for the purpose of studying their flora, more especially the grasses. Accompanied by my son, Albert E. Hitchcock, as assistant, I spent about five months on the islands, leaving in November. I will give a short account of the country, emphasizing the features that I think will be of interest to botanists, my choice of these features being based upon my own impressions.

A brief account of the geography, topography and climate will not be out of place because, though these data may be obtained from the usual sources, they are unfamiliar to nearly all botanists who have not visited the islands.

The group consists of several large inhabited islands and many small uninhabited islands. The latter, mostly reefs and rocks, lie far to the northwestward of the main group. Among these are Bird Island and Midway Island. The main group consists of eight islands. These in the order of their size from the largest to the smallest are:



THE HAWAIIAN ISLANDS.

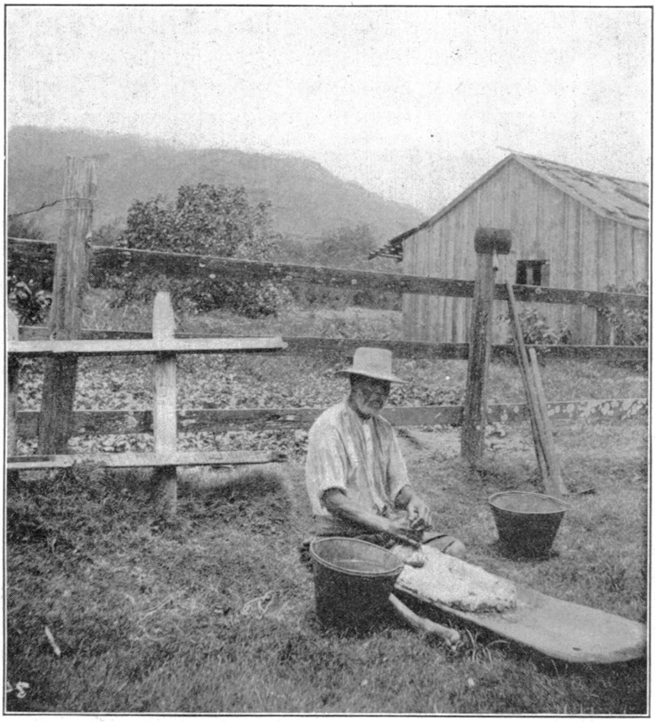


FIG. 1. A HAWAIIAN POUNDING THE TARO (*Colocasia esculenta*) TO MAKE POI, a starchy food much used by the natives.

Hawaii	4,015 square miles
Maui	728 square miles
Oahu	598 square miles
Kauai	547 square miles
Molokai	261 square miles
Lanai	97 square miles
Niihau	97 square miles
Kahoolawe	69 square miles

The islands are the most isolated on the globe. An idea of the vast expanse of surrounding ocean may be obtained from the table of distances from the nearest land in various directions.

To San Francisco	2,100 miles
To Tahiti	2,389 miles
To Samoa	2,263 miles
To Fiji	2,736 miles
To Yokohama	3,445 miles
To Sitka	2,395 miles
To Unalaska	2,016 miles

On account of this isolation the indigenous flora of the islands is comparatively meager, but contains a large proportion of endemic genera and species. All the islands of the group were visited except the two smallest, Niihau and Kahoolawe. The latter is barren and windswept, and at present uninhabited.

The group lies just within the tropics in about the latitude of Cuba, but because of the vast expanse of water the climate, though technically tropical, does not have the high temperature generally associated in the layman's mind with the tropics. The daily maximum temperature in summer at Honolulu is about 85°, the minimum about 75°. The winter temperatures are a few degrees lower.

All the islands are of volcanic origin and are very mountainous. The mountains intercept the northeast trade wind with the result that the eastern sides of the islands have a heavy rainfall while the western sides are dry or even arid. The rainfall on the east or north slopes of the mountains may be from 100 to 300 inches, or on Waialele (Kauai) as much as 600 inches per annum. On the other hand, the annual rainfall is below 15 inches on the southwestern sides of some of the islands.

The sugar industry is the most important and represents the investment of a large amount of capital. Sugar cane is grown on the four large islands on all the low lands where irrigation water is available. In spite of the heavy rainfall most of the plantations supplement this by irrigation, bringing the water from the mountains by means of ditches or aqueducts.

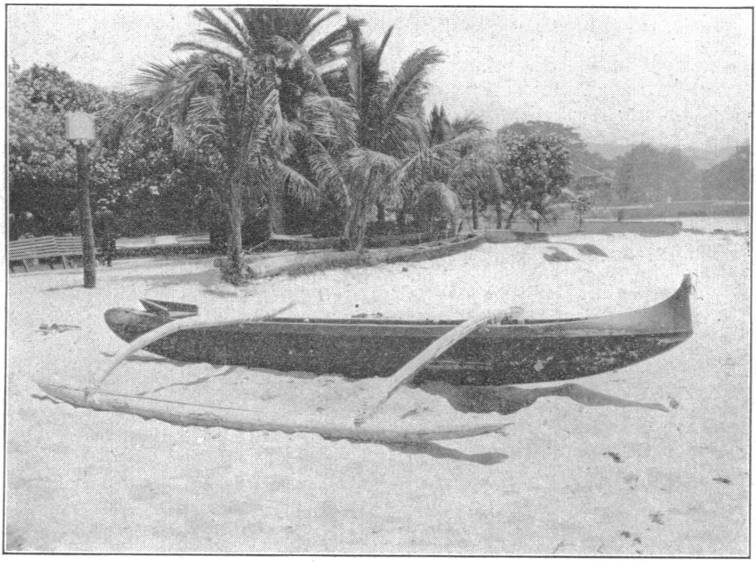


FIG. 2. AN OUTRIGGER CANOE AT WAIKIKI BEACH. The common form of native canoe.

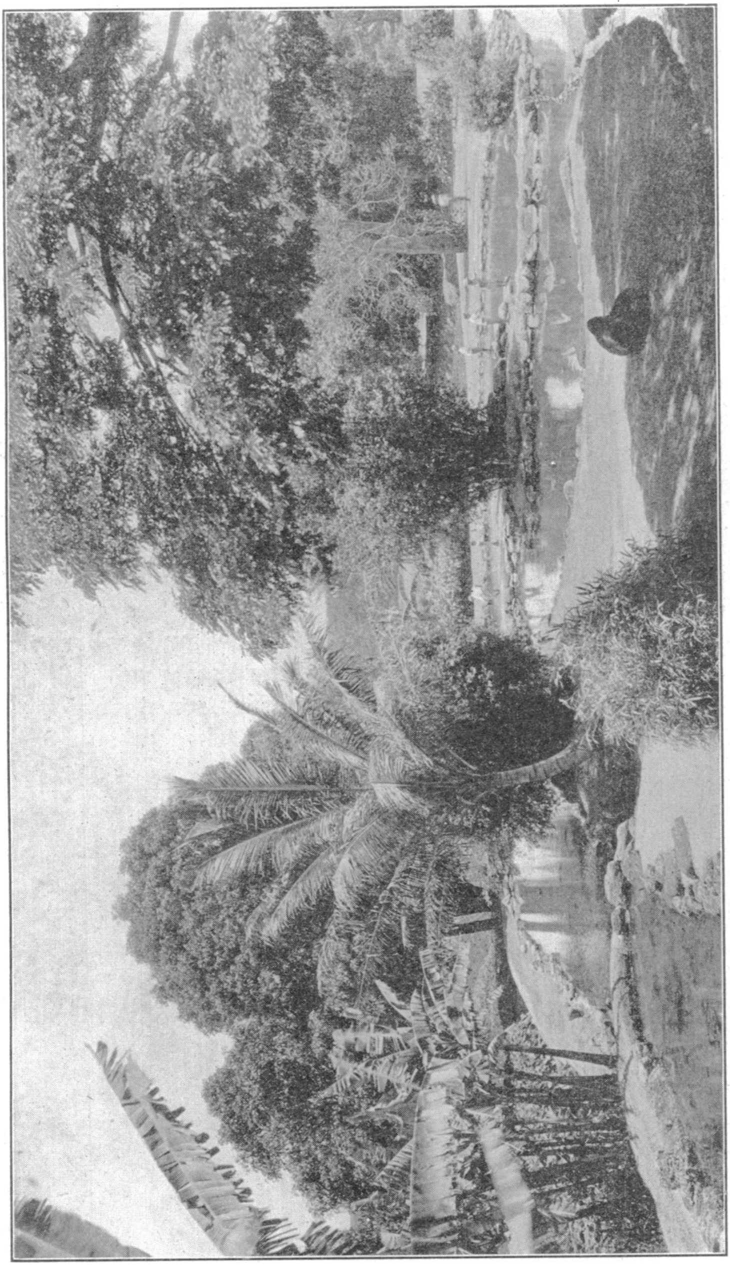


FIG. 3. VIEW IN MOANALUA PARK, HONOLULU.

Most of the sugar mills produce raw sugar, only one producing refined sugar.

The second important industry is stock raising. There are many large ranches devoted to the raising of cattle and sheep. The ranches occupy the land which is too dry for the successful growth of sugar cane. The island of Lanai is practically all one large ranch. The Parker Ranch upon Hawaii is said to embrace over 700,000 acres.

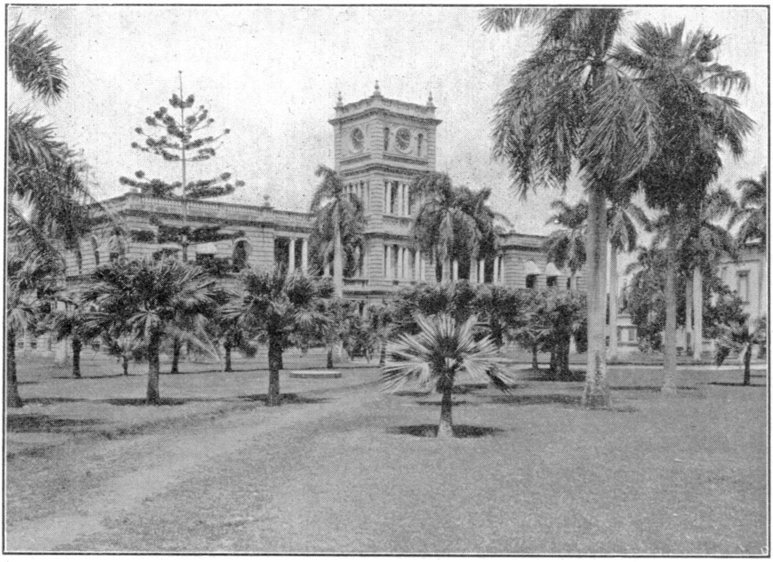


FIG. 4. THE MUNICIPAL BUILDING, HONOLULU, showing the gilded statue of Kamehameha in front. The tall palms are royal palms. At the left is an Araucaria.

The third industry is the growing of pineapples. In comparison with these three, the other agricultural industries are scarcely worth considering. Considerable rice is raised, mostly for local consumption, and there are a few coffee plantations in western Hawaii.

The native inhabitants of the islands, the original Hawaiian race, are fast disappearing, although there are a fairly large number of part-Hawaiians. The present population consists of Americans, Japanese, Chinese, Portuguese, Hindus, Koreans, Filipinos, negroes, and a scattering of other races or nationalities. At present the Japanese predominate. The staple vegetable food of the natives is poi, a product of the root of the taro plant (*Calocasia esculenta*). The starchy root is cooked and then pounded into a pasty mass (Fig. 1). The grass huts of the natives, now to be seen only in less frequented parts of the islands, consist of a framework of wood to which is attached

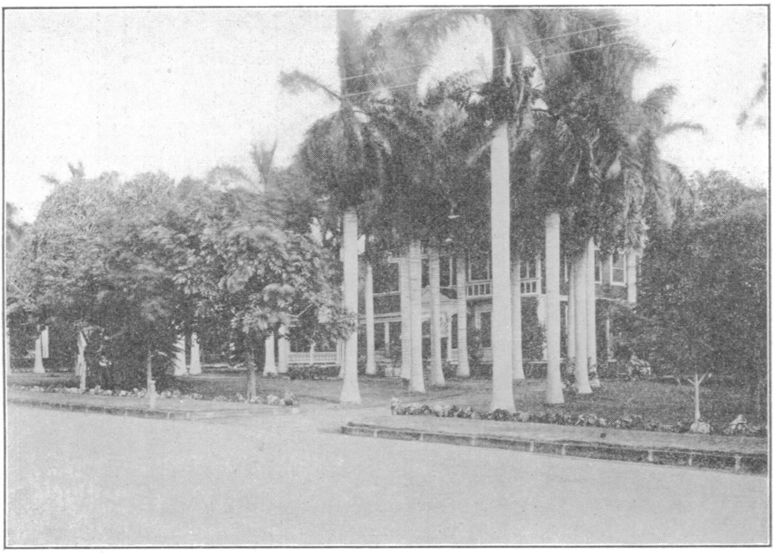


FIG. 5. A RESIDENCE IN HONOLULU WITH AN AVENUE OF ROYAL PALMS.

layers of pili grass (*Heteropogon contortus*), a common native grass on dry or rocky ground.

There are good roads on all the larger islands and travel in the inhabited portions is easy. The higher mountains are reached only by trails and are not easily accessible. Inter-island steamers facilitate travel from one island to another. One line leaves Honolulu in the forenoon and arrives at Hilo on Hawaii the next morning, stopping at Lahaina, island of Maui, on the way. Another line leaves Honolulu in the afternoon and arrives at Waimea, island of Kauai, the next morning. At

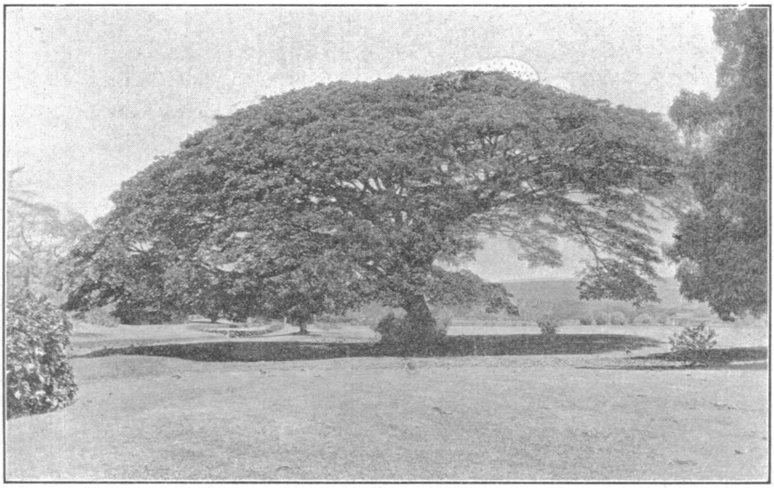


FIG. 6. MONKEY-POD (*Samanea Saman*), MOANALUA PARK. A beautiful round-topped tree frequently grown in parks. The grass in the foreground is Bermuda or manienie.

Lahaina one connects with steamers for Molokai and Lanai. There are other steamers that visit outlying points at varying intervals.

As the present article is not intended to be statistical, but rather to give a record of personal impressions, the islands will be discussed in the order in which they were visited.

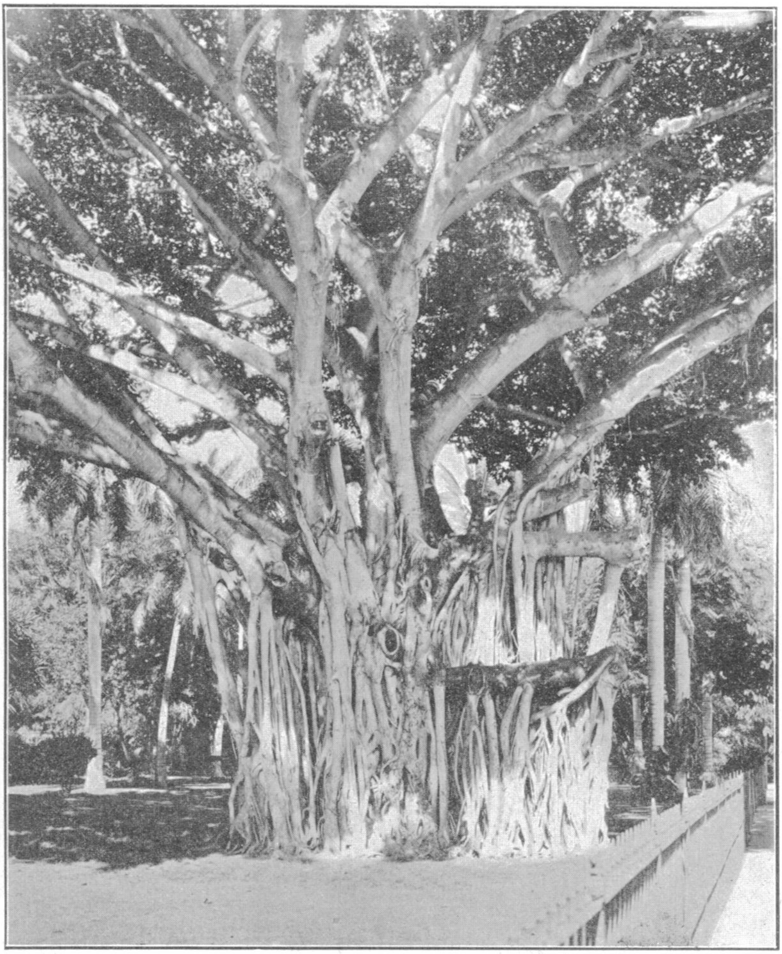


FIG. 7. A BANYAN TREE. The air roots around the trunk have become much condensed by trimming.

OAHU

Honolulu is the capital of the territory and is the only large city upon the islands. This is situated on the southwestern side of the island of Oahu, the locality being determined by the presence of a good harbor. The transpacific steamers drop their passengers here, hence Oahu is the first island of the group to receive the attention of the traveler. Honolulu itself is a handsome city and altogether is the most delightful place it has been the writer's privilege to visit. Back of the city is the Koolau range of mountains with many beautiful valleys lying between the steep ridges that reach down toward the shore at right angles to the main ridge. Honolulu occupies the plain along the coast and extends up into these valleys. A short distance beyond the limits of the city to the south is Diamond Head, a conspicuous promontory that dominates the landscape as one approaches by steamer. It is an old crater now occupied by fortifications. Between here and the city is the famous Waikiki Beach where the bathers throng and where one may see the celebrated surf riders and the outrigger canoes

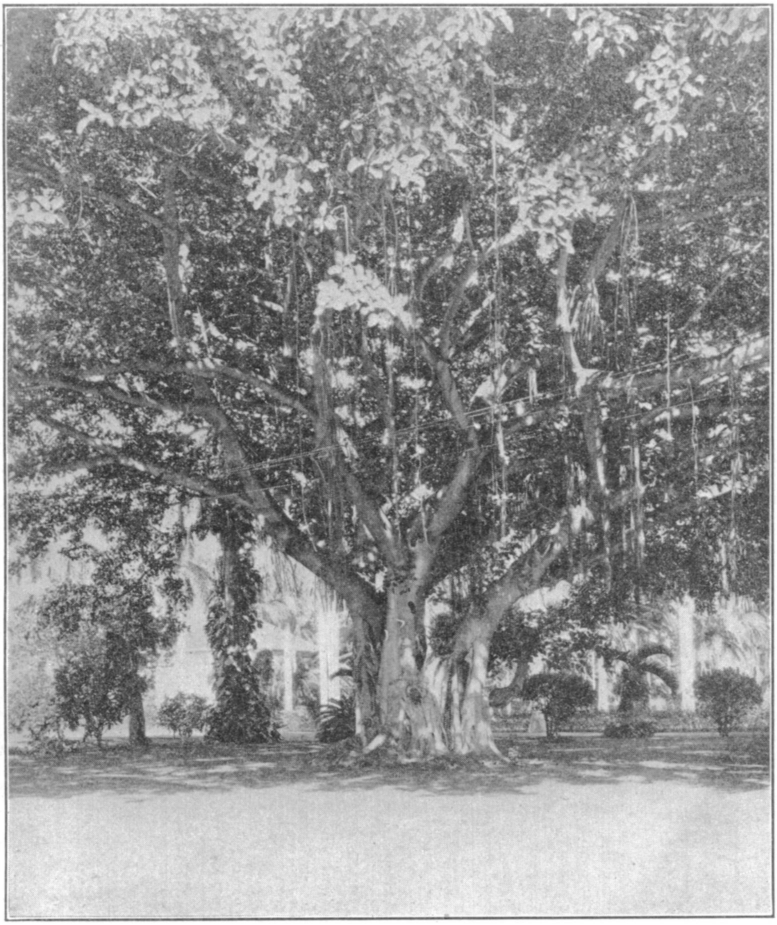


FIG. 8. A BANYAN TREE, showing numerous air roots hanging from the branches.

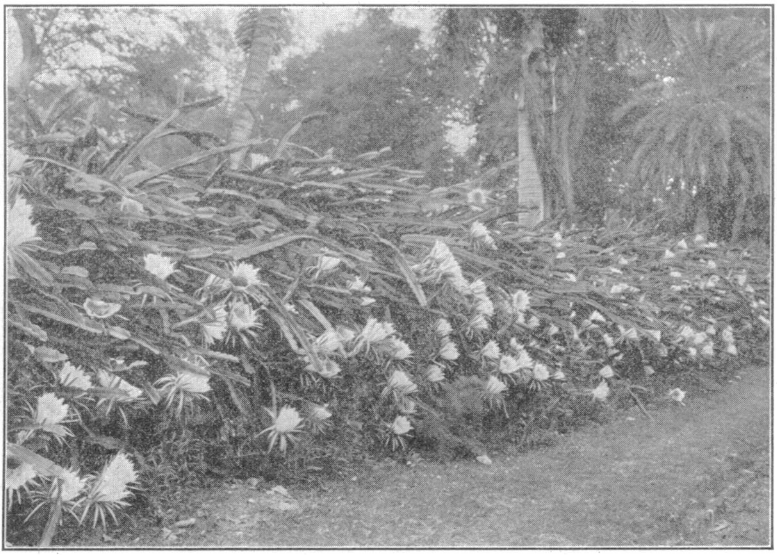


FIG. 9. A FAMOUS HEDGE OF NIGHT-BLOOMING CEREUS AT PUNAHOU COLLEGE.

(Fig. 2). Another crater known as Punchbowl lies just back of the center of the city.

The visiting botanist is greatly impressed with the beautiful exotic plants in the gardens and parks and along the streets (Figs. 3, 4). The palms are conspicuous, among them being the royal (Fig. 5), the coconut and the date. Two common street

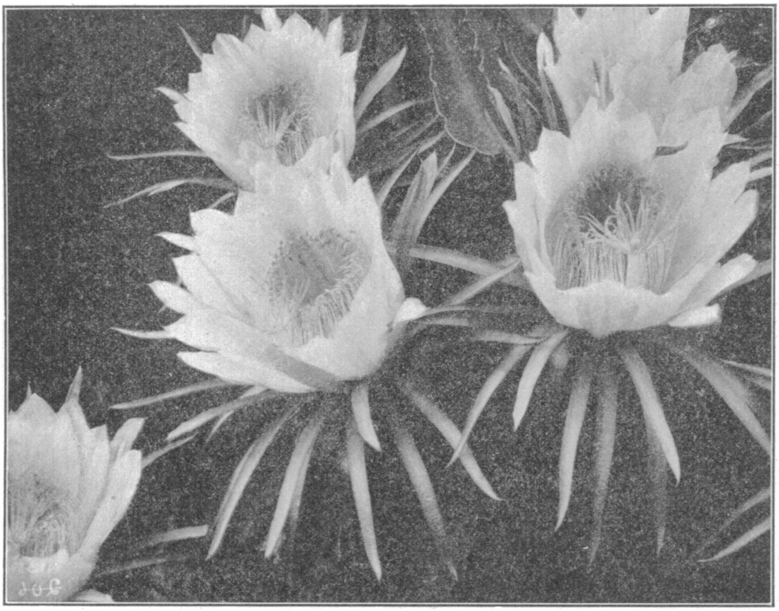


FIG. 10. NIGHT-BLOOMING CEREUS, a few flowers.

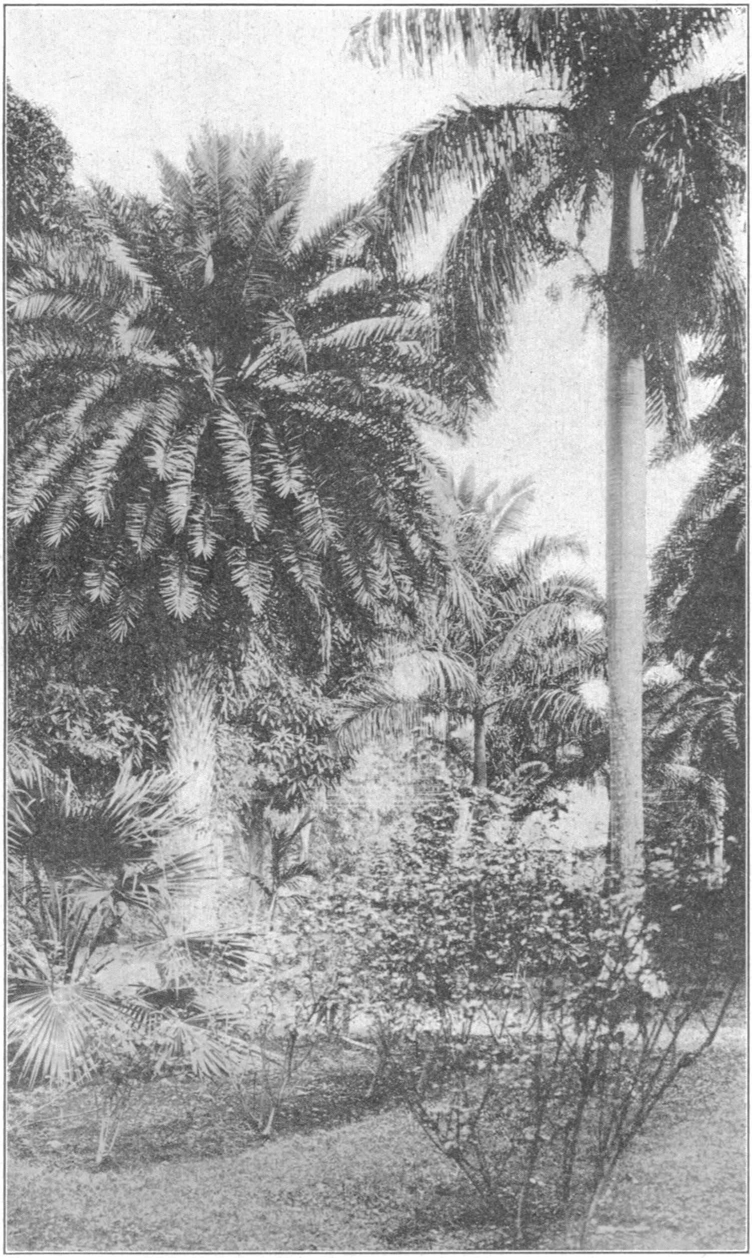


FIG. 11. VIEW IN THE HILLEBRAND GARDEN. This garden was formerly owned by Dr. Hillebrand, the author of the "Flora of the Hawaiian Island." It contains a great variety of exotic plants.

trees with strikingly beautiful flowers are the pink shower (*Cassia nodosa*) and golden shower (*Cassia fistula*). The latter has long, cylindrical, woody pods that look like a musician's baton. The hibiscus is much used as a hedge plant, there being scores of varieties, involving several species. The saman tree (*Samanea Saman; Pithecolobium Saman*) is a beautiful, symmetrical, roundtopped tree much grown in parks (Fig. 6). This is also called monkey-pod and rain-tree. The flame tree or royal poinciana (*Delonix regia*), familiar to the tourist in South Florida, is a deciduous tree, with very showy scarlet flowers that appear before the leaves. The banyan tree (Figs. 7, 8), with its numerous air roots hanging from the branches, is frequent in parks and lawns. The pepper tree, commonly cultivated in California, is planted along streets and drives. Clambering over a stone wall around Punahou College is a remarkably fine growth of night-blooming cereus (Figs. 9, 10). This cactus blooms en masse only at intervals of several weeks or months, though occasional flowers appear at irregular intervals. When in full bloom the effect is very striking. The large white funnel-shaped flowers, a foot long and several inches in diameter, open after sunset and close the following morning.

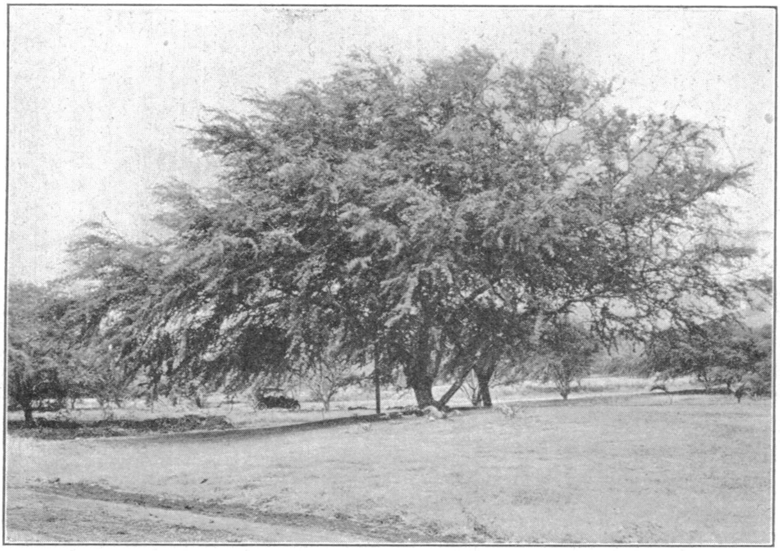


FIG. 12. ALGAROBA TREE (*Prosopis juliflora*) near the College of Hawaii. This tree is well naturalized on the drier sides of all the islands, usually forming a belt near the coast. It is also used as a street tree. The pods are greedily eaten by stock and furnish a considerable portion of the forage in the dry season. The flowers furnish honey, which is an important product on many of the ranches. The native name is kiawe.

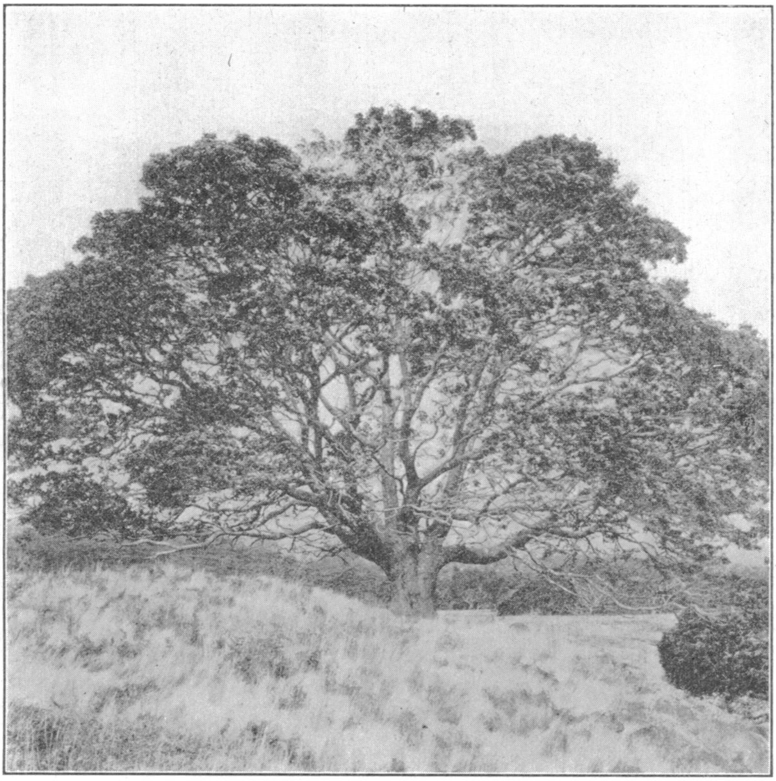


FIG. 13. KOA TREE ON NORTH SLOPE OF MAUNA KEA. An isolated specimen.

The accompanying photographs were taken between the break of day and sunrise, and the flowers had partially closed.

One of the favorite drives from the city leads over a pass in the Koolau Mountains. This pass, called the Pali or Nuuanu Pali, is about 1,200 feet altitude. The view from here is unusually fine. The trade wind blows through here with great force, at times so strong that the passage of vehicles is difficult, and pedestrians must make their way by aid of a wire cable stretched along the cliff. A remarkable effect of the strong wind is seen on a waterfall over a cliff to the west of the Pali. The water falls up instead of down. As it goes over the edge of the cliff it is caught by the wind and shoots straight up in the air.

There are two institutions in Honolulu of special interest to the taxonomic botanist. At the College of Hawaii, there is a large herbarium of Hawaiian plants in charge of Professor J. F. Rock, who has studied the flora intensively and has published several memoirs upon Hawaiian plants. Of special interest to visiting botanists are his two books, "The Ornamental

Trees of Hawaii" and "The Indigenous Trees of the Hawaiian Islands," both profusely illustrated from photographs.

The Bishop Museum possesses a large and important collection of ethnologic and natural history objects relating to the Hawaiian Islands and to Polynesia. There is a large herbarium of Hawaiian plants in charge of Mr. C. N. Forbes, who has traveled extensively over the islands and who has published several articles upon their flora.

Professor W. A. Bryan, professor of zoology and geology in the College of Hawaii, has published a book upon the "Natural History of Hawaii" which should be consulted by all botanical travelers.

The U. S. Experiment Station is in charge of Mr. J. M.

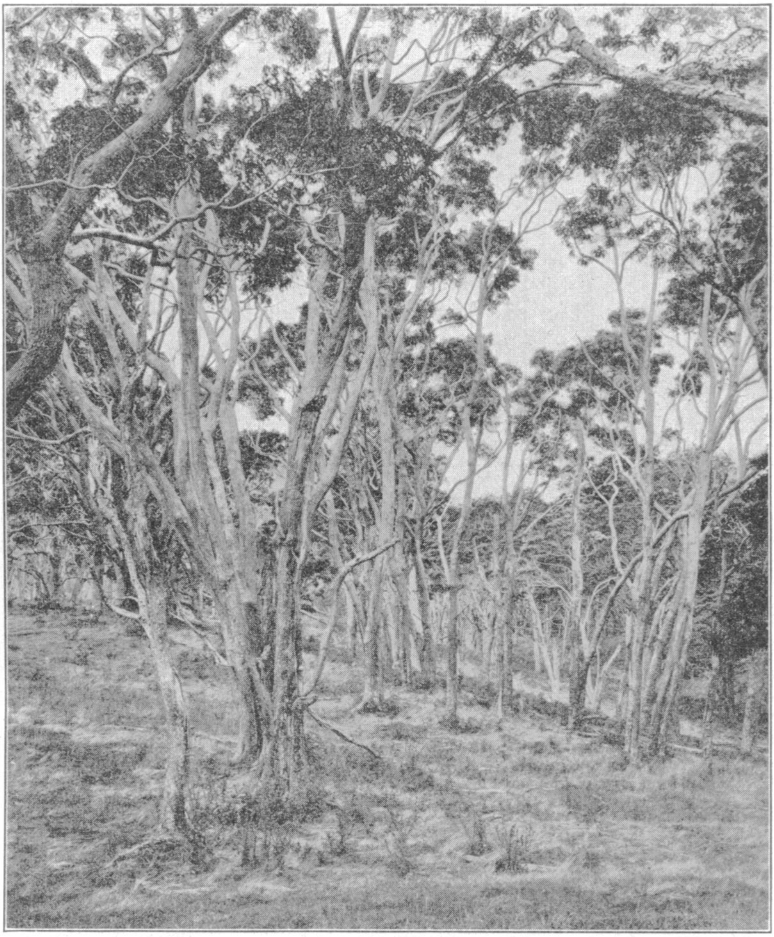


FIG. 14. KOA FOREST ON NORTH SLOPE OF MAUNA KEA. The trees as they look when crowded.

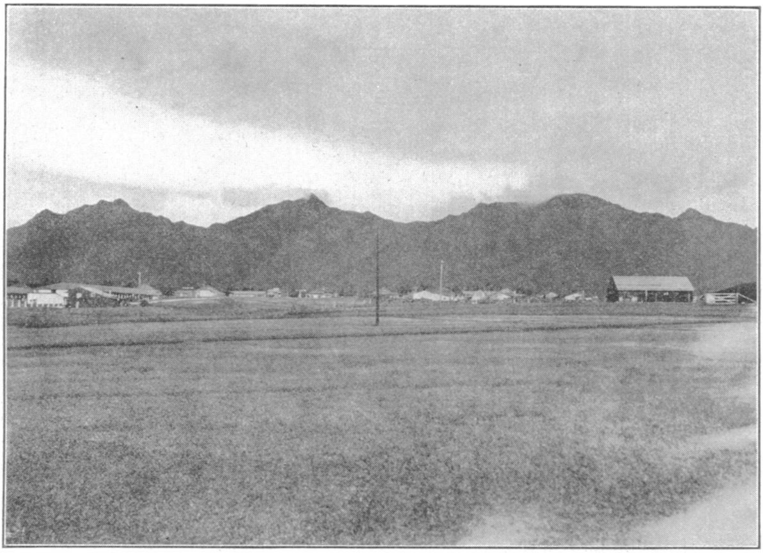


FIG. 15. SCHOFIELD BARRACKS. The western range of mountains is in the background, Mt. Kaala, the highest point in Oahu, being at the right. The grass in the foreground is mostly pilipiliula (*Chrysopogon aciculatus*). This is troublesome because the mature spikelets, with their sharp points, penetrate the clothing.

Westgate, formerly of the Bureau of Plant Industry, to whom the writer is indebted for many courtesies.

A fine collection of exotic trees and shrubs is to be found in the Hillebrand Garden (Fig. 11), now owned by Mrs. Mary E. Foster. This was once the home of Dr. W. Hillebrand, the author of the well-known "Flora of the Hawaiian Islands." Another fine collection of trees is in the grounds of the Board of Agriculture and Forestry, on King Street.

The flora in the immediate vicinity of Honolulu is disappointing. Scarcely a native plant is to be seen for several miles around, if one disregards plants of the beach and of the shore marshes. The moist open slopes are taken with Hilo grass (*Paspalum conjugatum*) and vast areas are overrun with guava and lantana (*L. Camera*). I saw enough fine yellow guavas going to waste to make guava jelly for an army. Of 60 species of grasses found around Honolulu, 50 species were introduced. An exotic tree, the kukui (*Aleurites moluccana*) has virtually become a weed, so widely is it introduced. The light green foliage is a striking feature of the landscape (Fig. 39).

An introduced tree of great economic importance is the algaroba (*Prosopis juliflora*), a relative of the mimosas (Fig. 12). This tree occupies great areas or belts in the low land near the coasts of all the islands, especially on the lee side. The flowers furnish nectar from which an excellent quality of honey is produced—the annual output of the Molokai Ranch being in excess of 100 tons. The pods are eagerly eaten by all kinds of animals and furnish an important source of feed.

Probably the commonest tree in the islands is the ohia (*Metrosideros polymorpha*), a variable species found from sea level to 9,000 feet altitude. The bark resembles that of our white oak, but the flowers, myrtaceous in structure, with numerous protruding stamens, are bright scarlet, or sometimes yellowish, and very showy. The most important forest tree is the koa (*Acacia Koa*) (Figs. 13, 14) and in abundance is probably second only to the ohia (o-heé-a). The wood of the koa is used for cabinet making and for construction. The ukulele, a mandolin-like musical instrument, is usually made of koa wood; and the ancient war canoes of the natives were hollowed out from the trunks of koa trees. The leaves of this tree, whose relatives are mostly Australian, are to us peculiar in that they consist of lanceolate flattened petioles (phyllodea), though the young trees, or young shoots on old trees, show twice pinnate leaves with flattened petioles.

The interior of Oahu is a plateau lying between the eastern and western chains of mountains. On this plateau is situated Schofield Barracks (Figs. 15, 16), where are quartered many of the troops. The open ground here is fine for parade purposes but is covered with a pestiferous little grass called pilipiliula (*Chrysopogon aciculatus*) whose mature florets end

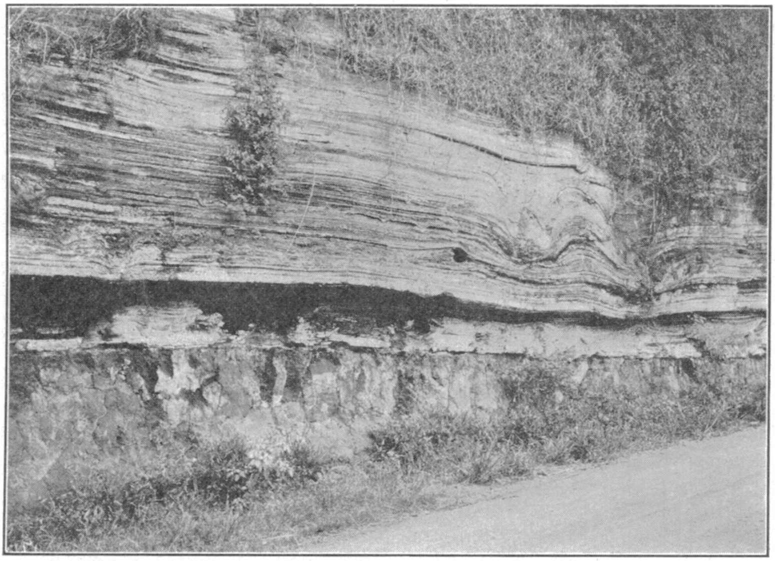


FIG. 16. STRATIFIED LAVA ON THE ROAD TO SCHOFIELD BARRACKS.

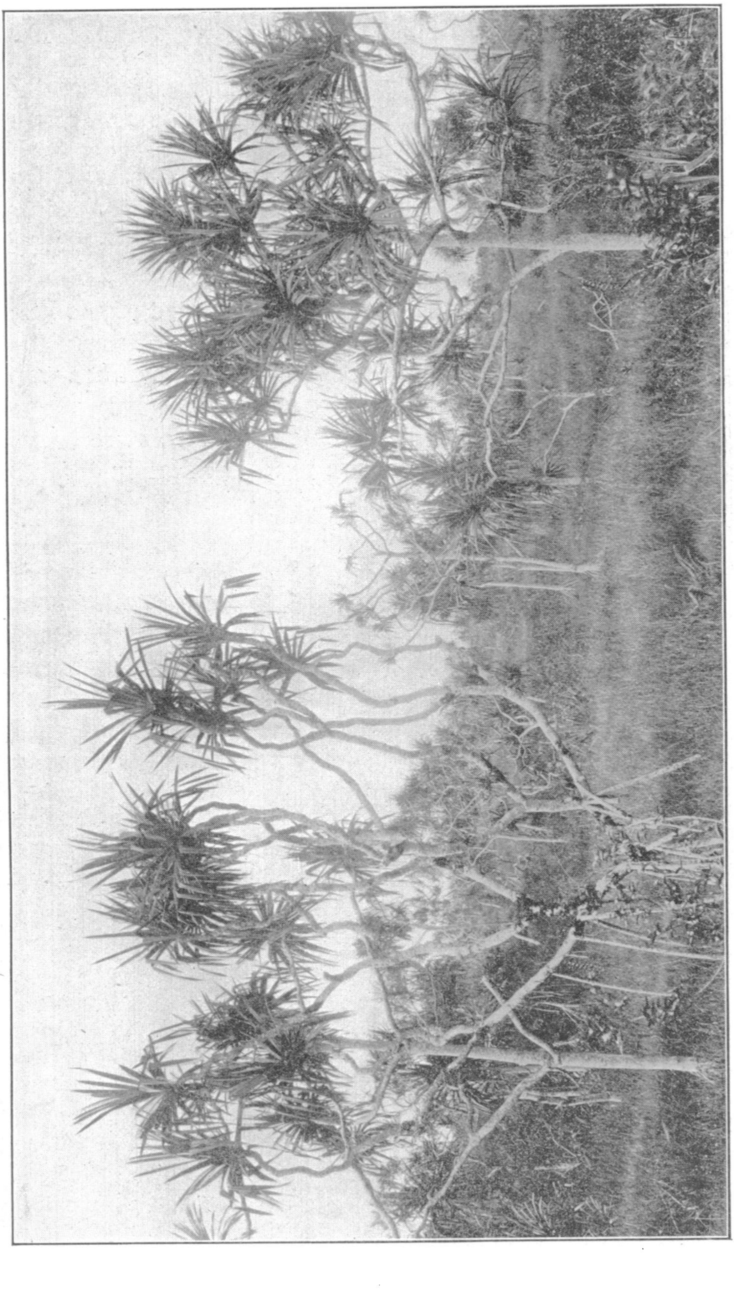


FIG. 17. A FOREST OF SCREW-PINE (*Pandanus odoratissimus*) near Hilo.

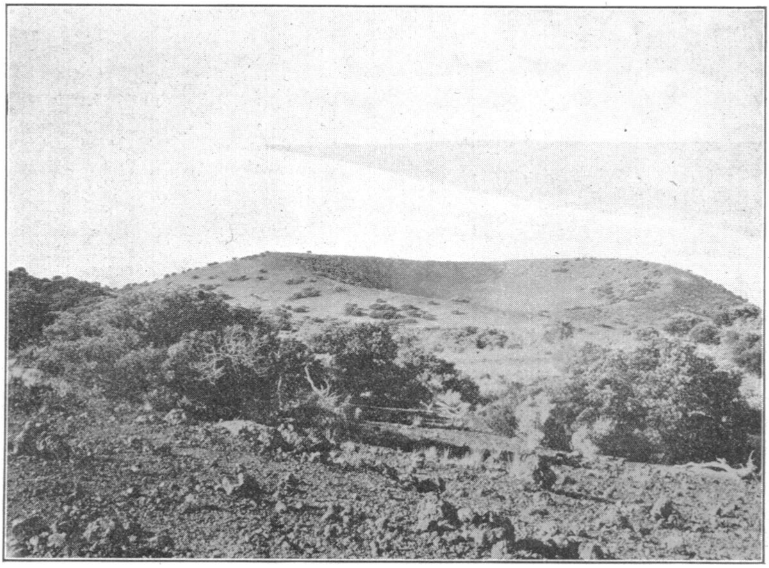


FIG. 18. VIEW ON MAUNA KEA, AT ABOUT 10,000 FEET, looking south, a small crater in the foreground, Mauna Loa in the distance, a cloud bank between.

in a sharp barbed point by which they easily penetrate the clothing of those who walk over it.

A common grass in lawns, parks, and dry open ground generally, is Bermuda or, as it is called there, manienie (*Capriola Dactylon*). An equally common but worthless grass in the wet regions is Hilo grass (*Paspalum conjugatum*). Both species are introduced.

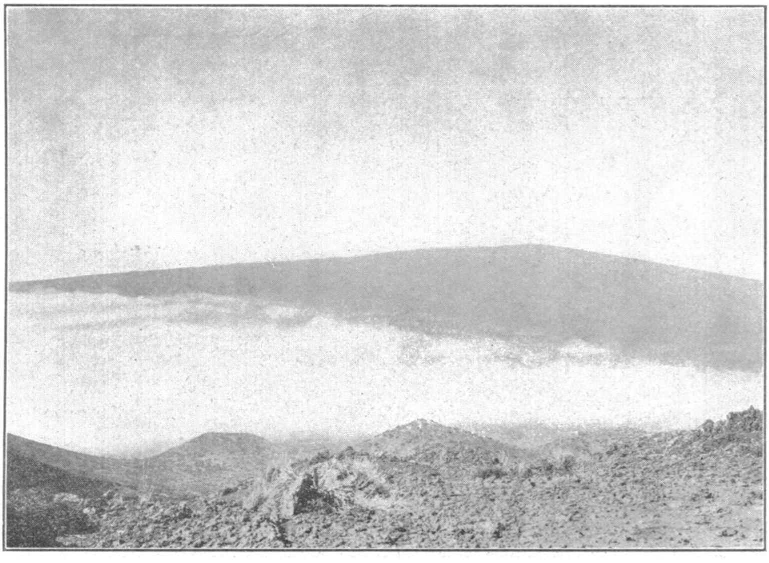


FIG. 19. VIEW OF MAUNA LOA FROM THE UPPER PART OF MAUNA KEA, a cloud bank between.

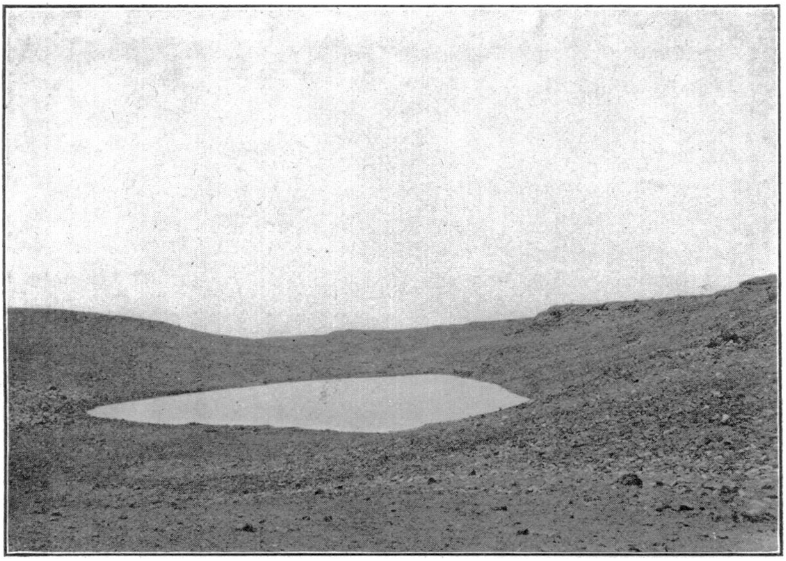


FIG. 20. SMALL LAKE NEAR SUMMIT OF MAUNA KEA. Altitude about 13,000 feet. Because of the porous lava soil lakes or ponds are rare.

HAWAII

The second island visited was Hawaii, the largest and southernmost of the group. This, the youngest geologically, presents greatly diversified examples of lava. We landed at Hilo, the largest town on Hawaii and the second in size in the islands. The rainfall here was excessive and the first thing done was to purchase a Chinese umbrella to protect ourselves against the frequent showers. In the low land along the coast in the vicinity of Hilo is a forest of puhala or screw-pine (*Pandanus odoratissimus*), a monocotyledonous tree with branched

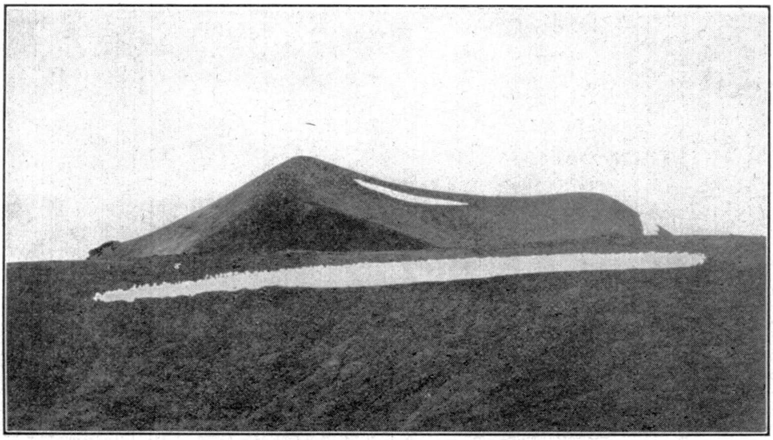


FIG. 21. SNOW BANKS NEAR THE SUMMIT OF MAUNA KEA.

stems, aerial roots, and great compound fruits like pineapples (Fig. 17).

We went by rail to Kukaiau where we were met by Mr. McAllister, manager of the Kukaiau Ranch, who took us to the ranch on the northern slope of the island. On account of the lack of running water rainwater is collected by means of large sheet-iron roofs supported on posts, and conducted into tanks or ponds. The ranch runs well up on the slopes of Mauna Kea. At the upper stretches, 4,000–8,000 feet, many of the common meadow and pasture grasses of the United States are thriving. Among these are blue-grass, orchard-grass, meadow fescue, meskit or velvet-grass, and Italian rye-grass. Natal-grass (*Tricholaena rosea*) was common at lower altitudes. *Paspalum dilatatum* is giving excellent results as a pasture grass.

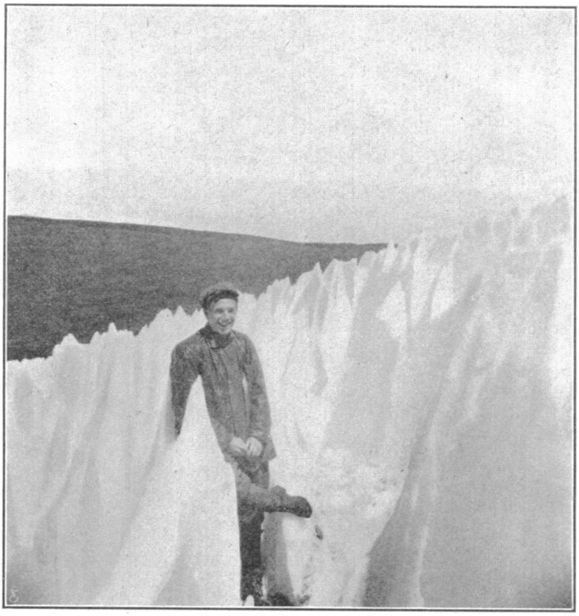


FIG. 22. A SNOW BANK NEAR THE SUMMIT OF MAUNA KEA.

The next stage of our journey was the Parker Ranch, the largest ranch in the island. Our headquarters were at the residence of the manager, Mr. Alfred W. Carter, near Waimea. The Kohala Mountains near by are very wet, but much of the land in the interior is dry. The great interior plain between Mauna Kea and Mauna Loa is covered with grasses, composed largely of species of *Eragrostis* (*E. atropioides, E. hawaiiensis*). Through the courtesy of Mr. Carter we were able to visit the summit of Mauna Kea. There are two high moun-

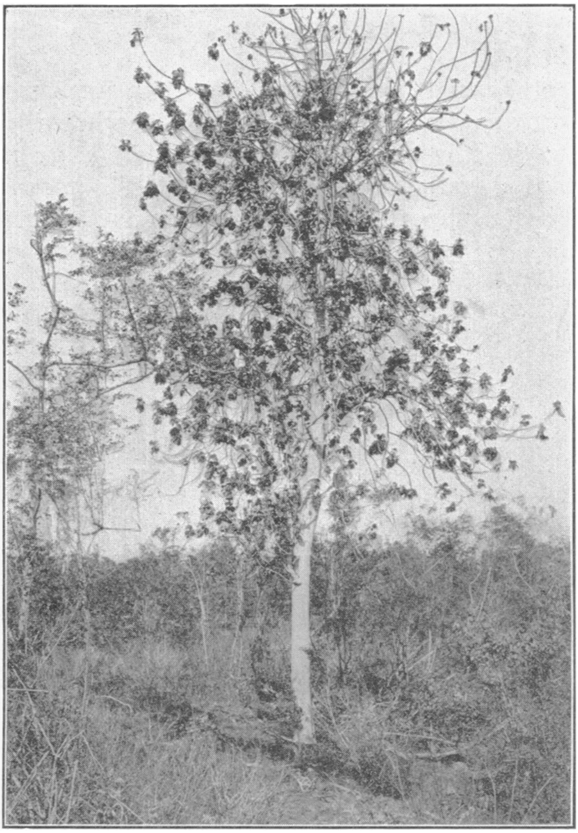


FIG. 23. A KOKIO TREE (*Kokia Rockii*) IN FOREST ON LAVA FLOW NEAR PUU WAAWAA. An ally of the cotton with large red flowers. Endemic in this region and consisting of rather few individuals.

tains on the island, Mauna Kea to the north, 13,825 feet altitude, and Mauna Loa to the south, 13,675 feet altitude. These mountains slope rather gradually from the sea to the summit. They form an immense cone rising from the floor of the ocean 18,000 feet below the surface, or about 32,000 feet altogether.

We were taken by automobile to the Humuula sheep-station on the south slope of the mountain at an altitude of about 6,700 feet. The following morning we ascended the peak on horseback. The upper stretches, consisting of cinder slopes, are tiresome to travel over, but not dangerous. At about 9,000 feet we rose above the clouds which now lay as a billowy white ocean between the two mountains (Figs. 18, 19). The upper forest consists largely of mamani (*Sophora chrysophylla*). At about 10,000 feet the trees disappear and the sparse vegetation consists of low shrubs and bunch grasses. The latter consist chiefly of three species, *Agrostis sandwichensis, Deschampsia australis,*

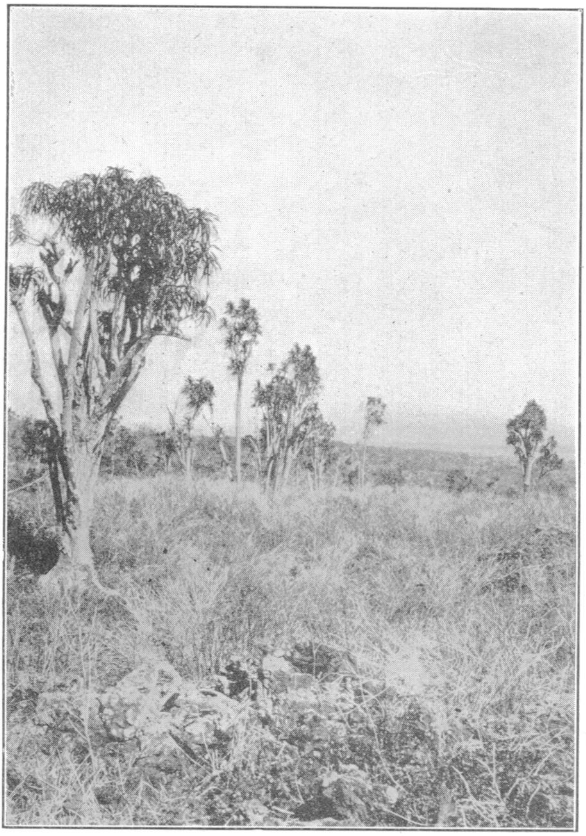


FIG. 24. HALAPEPE TREES (*Dracæna aurea*) ON AA (ROUGH) LAVA, PUU WAAWAA. The leaves are eaten by cattle.

and *Koeleria glomerata.* Not far from the top there is a small lake of clear palatable water, an unusual sight, as lakes are rare in the lava soil of the islands (Fig. 20). There are many banks of snow in protected places among the cones on the summit (Figs. 21, 22). There is considerable snowfall in the winter and many banks persist throughout the year.

Our next stop was at the Puu Waawaa Ranch in North Kona on the western side of the island near the Hualalai Mountains. This ranch is owned by Mr. Robert Hind, through whose courtesy we visited the top of the Hualalai Mountains, the highest peak of which is 8,269 feet. The ranch takes its name from an isolated hill or old volcanic cone fluted with deep gullies, the top covered with forest. All the water upon the ranch of over 150,000 acres is rainwater impounded in large tanks, several of which hold 100,000 gallons each. Mr. Hind has a fine meadow of Rhodes grass which yields crops of hay several

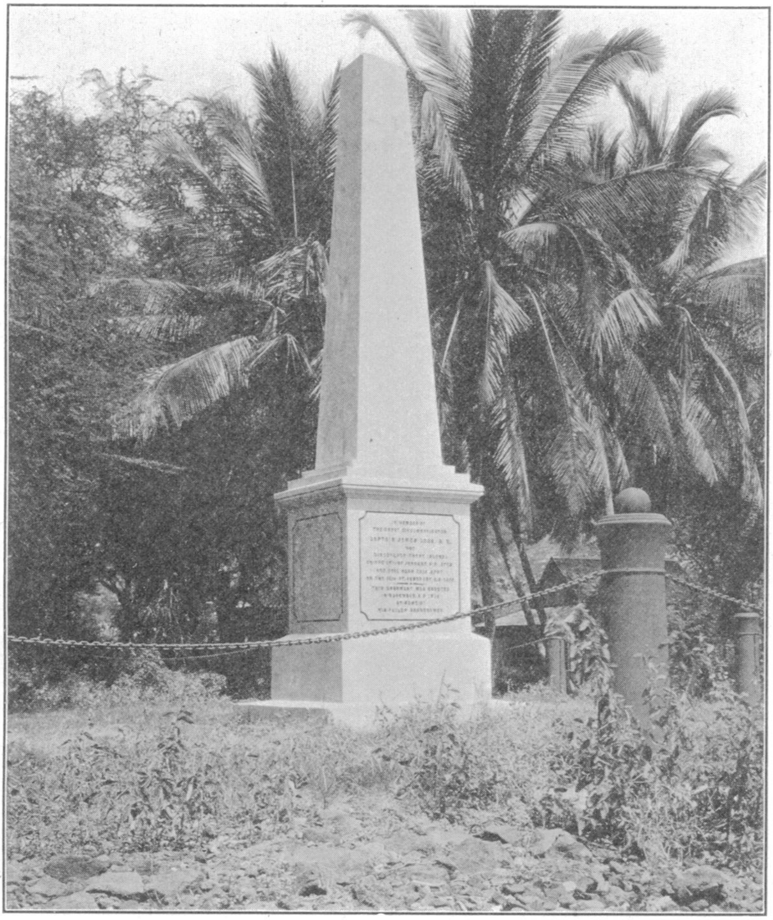


FIG. 25. COOK'S MONUMENT ACROSS THE BAY FROM NAPOOPOO. This marks the spot where Captain Cook was killed.

times a year. It is upon Mr. Hind's place that is found the tree cotton or kokio (*Kokia Rockii*), a peculiar plant allied to the cotton, with gorgeous crimson flowers about four inches long (Fig. 23). The trees are scattered in the scrubby timber on rough lava southwest of Mr. Hind's house, but are not known to grow elsewhere. There is also here a forest of halapepe (*Dracaena aurea*), a liliaceous tree resembling some of our western yuccas (Fig. 24). The leaves are fed to cattle when there is a shortage of forage.

The next stop was made near Honaunau in South Kona, at the place of Mr. Jared Smith, formerly director of the Hawaiian Experiment Station. Mr. Smith kindly placed his cottage at our disposal. Being directly west of Mauna Loa, we made a trip up through the rain forest to an altitude of about 3,000 feet. Ferns were here the dominating feature—a bewildering variety. Near Honaunau is Napoopoo, across the bay from which is the monument (Fig. 25) erected to mark the spot where Captain Cook was killed by the natives in 1779. At Honaunau on the coast is the City of Refuge, an enclosure used by the early Hawaiians as a sanctuary to which those in peril might flee for protection. The walls are twelve feet high and fifteen feet thick (Fig. 26).

We were taken by automobile over an excellent road around the south side of the island to the Crater Hotel near the volcano of Kilauea. The crater is at an altitude of about 4,000 feet and measures about three miles from north to south and two miles from east to west, the floor being nearly 500 feet below the rim (Figs. 27, 28). Near the south end of the crater is the lava pit, called Halemaumau, in which the liquid lava is now in a state of activity, boiling and splashing, and throwing up great fountains of spray. It is one of the most marvelous natural phenomena it has been my good fortune to observe. The view at night is especially wonderful. The red-hot lava breaks on the shores of the lake with a sound like breakers on the seacoast. Fortunately the lake can be viewed in safety from the rim, as the upheaval of the contents is not violent enough to endanger the onlookers.

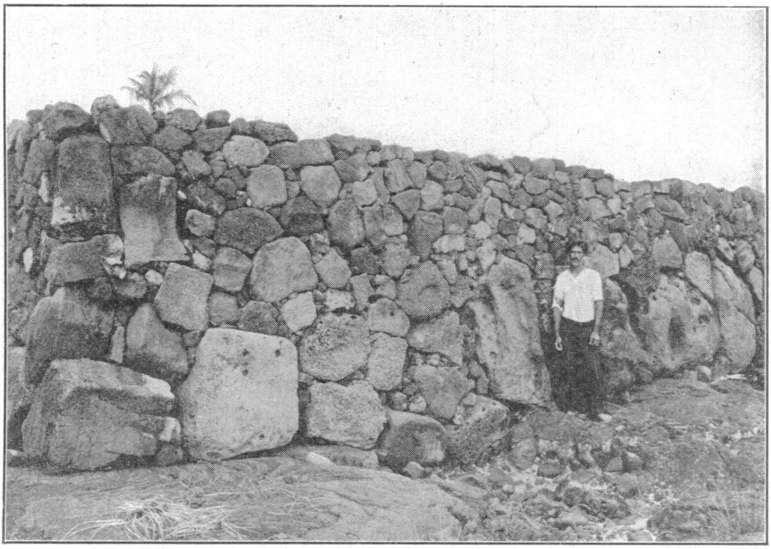


FIG. 26. CITY OF REFUGE, HONAUNAU. "A stone wall twelve feet high and fifteen feet thick encloses seven acres of tabu ground; to such sanctuaries women and children, warriors worsted in battle, criminals and others in peril might flee for safety from their avengers." (Bryan, "Natural History of Hawaii.")

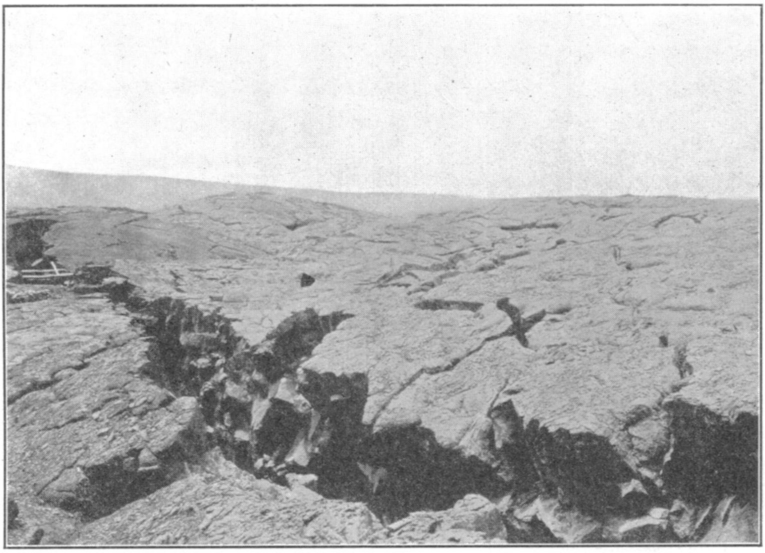


FIG. 27. A CRACK IN THE LAVA IN THE CRATER OF KILAUEA.

With the aid of Mr. Short, the kindly keeper of the Crater Hotel, we arranged for the ascent of Mauna Loa. Two saddle horses and a pack horse were obtained at the Dent Ranch near the volcano. We went without a guide, taking bedding and enough food for three days. We reached a resthouse on the east flank of the mountain at an altitude of about 10,000 feet, where we remained for the two nights. The resthouse contains

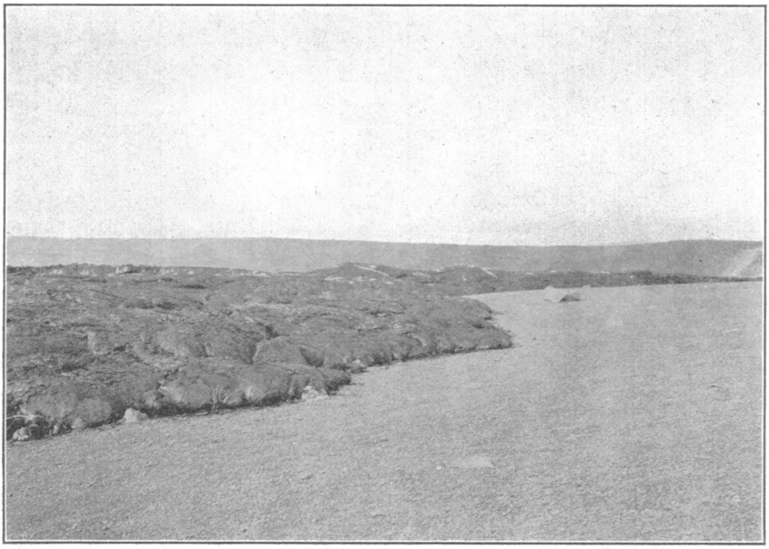


FIG. 28. EDGE OF A LAVA FLOW NEAR THE LAVA PIT.

cooking utensils, a few articles of furniture, and an oil stove with a supply of oil. Water is supplied from a rainwater tank.

We started on the ascent as soon as it was light the following morning, taking a canteen of water, a light lunch, the plant pick, and our large camera with its tripod. There is no definite trail, but the way is marked by monuments. For three or four miles these monuments are staffs with white metal disks, but beyond this there are piles of stones with a white rag fastened around the uppermost stone. The lava is very rough and is very wearing upon the shoes. There seems almost an infinite variety of lava (Fig. 29) and there are many caves, craters and chasms that attract one for further exploration. Bubbly lava, covering large areas, is tiresome or even dangerous to traverse. What appears to be a hard surface proves to be a thin coating over air spaces varying in depth, but usually not over fifteen or twenty inches. The sudden fall through the crust produces a very disconcerting sensation. Dangerous chasms and caves abound, but may be avoided in the day time by using normal caution. The crater at the summit, a distance of about ten miles from the resthouse, was reached about 2:30 P.M. Time did not permit a descent into the crater, but photographs were taken giving a general view with snowbanks in the distance. About half an hour was spent here. One of my shoes had been dangerously worn on the sole, though thickly hob-nailed. It

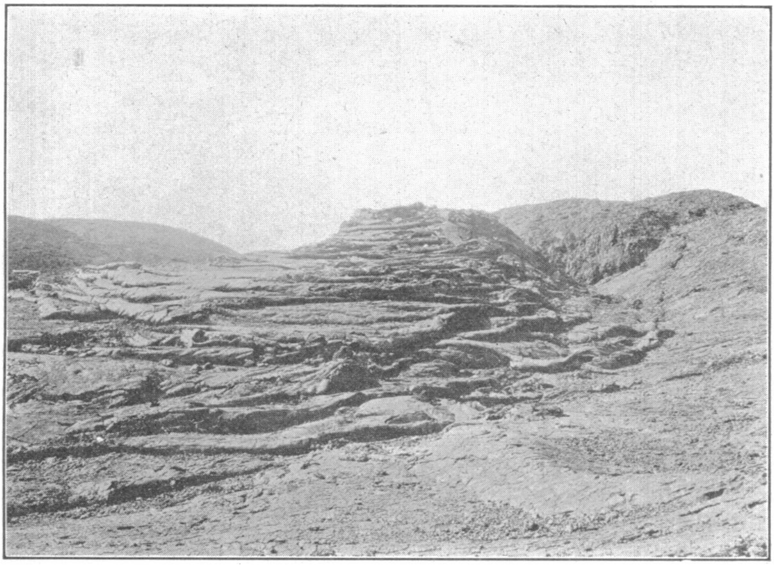


FIG. 29. LAVA FORMATION ON MAUNA LOA (pahoehoe or smooth lava).

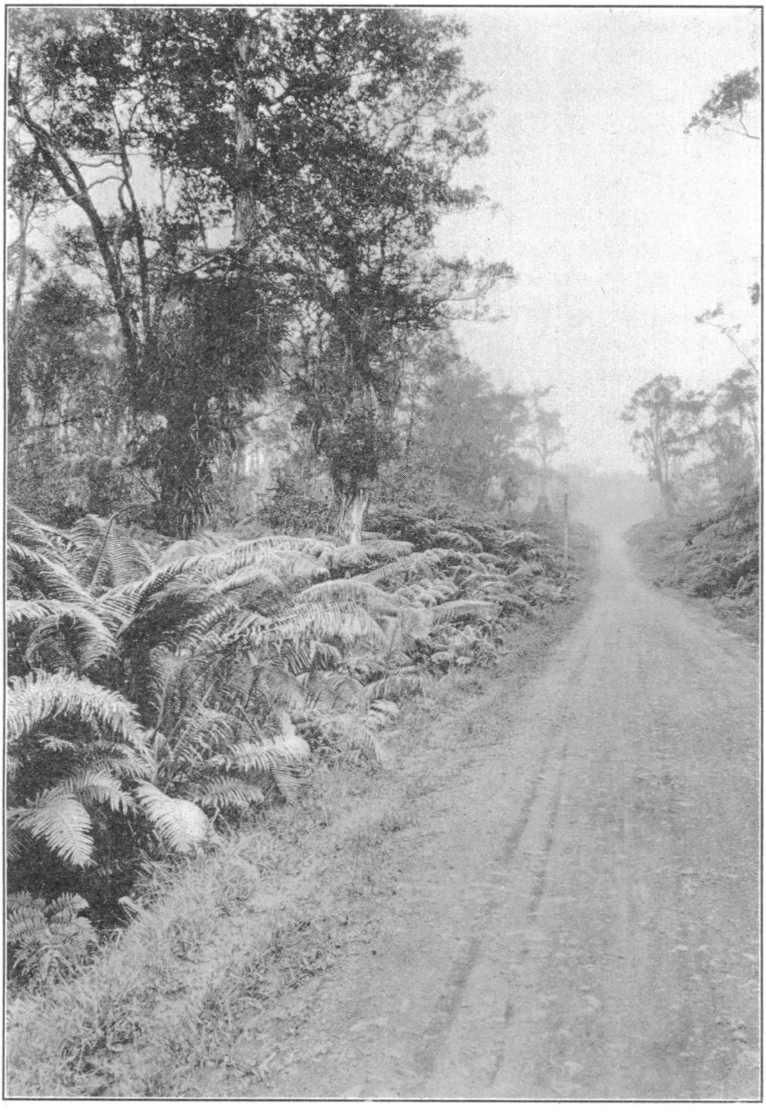


FIG. 30. ROAD FROM GLENWOOD TO VOLCANO HOUSE. Ferns very abundant. *Freycinetia Arnottii* climbing an Ohia Tree (*Metrosideros polymorpha*).

became necessary to do something to the shoe to protect the sole. Fortunately I had found a discarded fruit can which we were able to utilize for the purpose, otherwise I should have been in a dangerous condition, miles from the resthouse, on rough lava, with my foot unprotected. We commenced the return at 3:00 P.M., but were able to traverse only about half the distance before being overtaken by darkness. Little progress could now be made until the nearly full moon rose about 7:00 P.M. As soon as the light was sufficient we were able to go faster, but the monuments could be located only with difficulty. I remained with one monument until Albert had located the next. In order to avoid the dangerous places the trail takes unexpected turns, thus increasing the difficulty in finding the successive monuments. After about a mile or less of this we lost the trail and determined to make for a hill a mile distant which we thought we had passed on the outward trip. This we did and picked up the trail again. However, in a short time we were again lost. After searching through an entire circle for the next monument we decided again to go eastward toward a distant hill from the top of which we might determine our position. These trips across the lava were exceedingly tiresome and were accompanied by no little danger. We got into bubbly lava from which there seemed no exit and in which we were threatened with engulfment at every step. Chasms and pits were avoided by a hair's breadth. The slanting moonlight made everything shiny bright on one side and black as night on the other. Frost was settling on the rocks, adding to the confusing reflections. At sundown we were so tired we could hardly put one foot before the other. But the dangers of the night travel banished our fatigue for the time being. We finally reached the hill for which we were making, ascended it only to find ourselves looking down into a crater and with no view to the east. We were lost, cold, hungry, thirsty, and ready to drop from exhaustion. To remain inactive till morning invited death from the cold. As it was necessary to keep moving, we decided to proceed eastward in the direction we thought the resthouse to be. After descending the cone Albert thought he saw a staff in the distance to the north. Examination proved the correctness of his surmise. The trail was recovered! We were able to follow the monuments, but it took us two hours more to reach the resthouse. The piece of tin on my shoe had worn through and the leather of the sole was at its last point of resistance.

We returned to the Crater Hotel the following day none the worse for our adventure.

A short time was spent at Glenwood with Mr. Thompson the superintendent of the station located here, a branch of the U. S. Experiment Station at Honolulu. We are here in a very wet region. Visitors to the volcano usually come by rail from Hilo to Glenwood, the terminus, and continue by automobile bus over a beautiful fern-lined road to the hotels (Fig. 30), a distance of 8 miles. Or one may go the entire distance from Hilo by auto, about 35 miles.

(*To be continued*)